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ABSTRACT

This practicum was developed to provide faculty and administrators in a K-12 school system with the necessary skills and instruction to incorporate Internet technologies into the curriculum using the existing resources located in the school. The project was divided into three phases. The initial phase developed staff and community awareness. The next phase provided training using innovative times, locations, and resources. The final phase consisted of systematically incorporating training resources with existing curriculum activities. Six outcomes were achieved as planned. Teachers were trained to use the Windows 95 user interface to access Internet technologies. Teachers received training to use World Wide Web browsers, search engines, and e-mail, and to create Web pages using traditional and distance instructional delivery models. Appendices include the faculty survey, outcome checklist, skill checklist, curriculum project, e-mail checklist, skill analysis for launching Internet Explorer, equipment sign out letter and form, and student skills chart. (Contains 30 references.) (Author/MES)

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Increasing the Use of Instructional Technology within the K-12 Curriculum Through Staff Development

by
Salvatore P. Ferraro
ITDE Cluster 2

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A Practicum Report Presented to
the Ed.D. Program in Instructional Technology and Distance Education
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

Nova Southeastern University
1999

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APPROVAL PAGE

This practicum took place as described.

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This practicum report was submitted by Salvatore P. Ferraro under the direction of the advisor listed below. It was submitted to the Ed.D. Program in Instructional Technology and Distance Education and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Nova Southeastern University.

Approved:

May 6, 1999
Date of Final Approval of Report

Marsha Burmeister Ed.D.
Advisor

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ABSTRACT

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This practicum was developed to provide faculty and administrators in a K-12 school system with the necessary skills and instruction to incorporate internet technologies into the curriculum using the existing resources located in the school. The project was divided into three phases. The initial phase developed staff and community awareness. The next phase provided training using innovative times, locations and resources. The final phase consisted of systematically incorporating training resources with existing curriculum activities.

Six outcomes were achieved as planned. Teachers were trained to use the Windows 95 user interface to access Internet technologies. Teachers received training to use web browsers, search engines, e-mail and create web pages using traditional and distance instructional delivery models.

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Chapter 1: Introduction

Description of the Setting and Community

The diocese of this practicum location covered approximately one-quarter of a state located in the Northeast. The total number of schools within the organization was 59. Fifty schools were elementary and nine schools were at the high school level. The organization employed approximately 1,100 teachers to service nearly 26,000 students.

The diocese covered 11 counties and 8,466 square miles of the state. The county where the schools for this practicum was located had a mixture of rural, urban, and metropolitan populations. The family household median income of the county was $30,349.00

Writer's Work Setting

The work setting where this practicum occurred spanned four schools that were spread over three municipalities that were within a 12 mile radius. According to the mission statement of the organization, technology was viewed as an effective and necessary tool that was capable of enhancing both the communication skills and productive capacity of its students, staff, and parents.

The mission of the organization sought to produce a learning environment for an ever-changing world. It perceived the role of technology to enable its students and staff to access information efficiently, enhance problem-solving skills, encourage collaborative lifelong learning, and become effective communicators as well as responsible citizens.

While the four schools within this organization agreed to work together in a partnership to promote change and reform, each school represented a single, unique entity that ran autonomously from other schools within the diocesan organization. They each had their own budget and strategic plan with which to select resources.

The target population of the writer's practicum was comprised of classroom teachers from pre-kindergarten through twelfth grade as well as school administrators from three elementary schools and one high school. The four schools were selected by the writer because each had an existing networked computer lab connected to the Internet.

The first elementary school in this practicum location provided instruction for students ranging from pre-kindergarten through eighth grade. The enrollment for the 1997 school year was 163 students compared to 185 for 1996, and 210 for the year 1995 (see Figure 1).

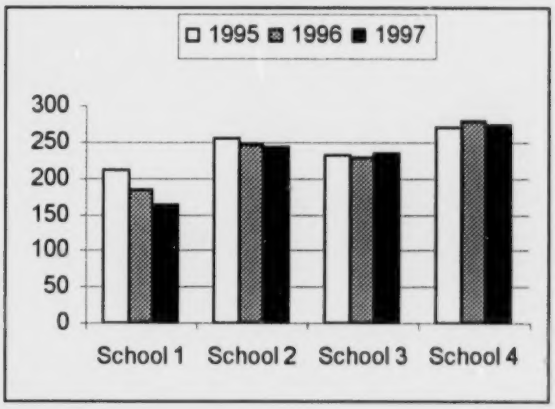

Figure 1 School officials considered enrollments as an indicator of the public's perception of a school's ability to provide a quality education.

Upon implementation, this school chose to purchase additional computers. A networked computer was added to each classroom. It was designated as a teacher's workstation (see Table 1).

Table 1 Summary of Networked PCs on Site

Pre-implementation

	Lab PCs	Admin PCs	Teacher PCs
School 1	14	2	0
School 2	15	0	4
School 3	16	2	4
School 4	23	0	0

Post-implementation

	Lab PCs	Admin PCs	Teacher PCs	Increase
School 1	14	2	8	8
School 2	16	2	8	7
School 3	16	2	6	2
School 4	22	0	0	0

There were eight full-time and four part-time faculty members. The school contained nine classrooms and 61 computers. Students utilized 59 of the computers. Two computers were used in an administrative capacity. There was one computer lab in the school that contained 14 computers networked to the Internet by Windows NT and a shared 56K dial-in connection.

The second school provided instruction for students ranging from kindergarten through eighth grade. The enrollment for the 1997 school year was 243 students compared to 247 for 1996, and 255 for the year 1995. There were nine full-time and four part-time faculty members. The school contained 12 classrooms and 22 computers. Students utilized 19 of the computers and one computer was used in an administrative capacity. Upon implementation, this school also chose to purchase additional computers. A networked computer was added to each classroom. It was designated as a teacher's workstation. There was one computer lab that contained 14 computers networked to the Internet by Windows NT and a shared 56K dial-in connection.

The third school provided instruction for students ranging from kindergarten through eighth grade. The enrollment for the 1997 school year was 234 students compared to 229 for 1996, and 231 for the year 1995. There were nine full-time and two part-time faculty members. The school contained nine classrooms and 17 computers. Students utilized 16 of the computers and one was used in an administrative capacity. Upon implementation, this school chose to purchase additional computers. A networked computer was added to each classroom. It was designated as a teacher's workstation. There was one computer lab that

contained 16 computers networked to the Internet by Windows NT and a shared 56K dial-in connection.

The fourth school provided instruction for students ranging from ninth through twelfth grade. The enrollment for the 1997 school year was 274 students compared to 280 for 1996, and 271 for the year 1995. There were 23 faculty members. The school contained 22 classrooms and 50 computers. Students utilized 44 of these computers and six were used in an administrative capacity. There was one computer lab that contained 23 computers networked to the Internet by Windows NT and a shared 56K dial-in connection.

Writer's Role

The role of the writer was to provide leadership as a technology consultant, in-service coordinator, in-service resource developer, in-service instructor, and web master using 25 years of teaching experience to improve the curriculum and content delivery offered to students in the schools included in the practicum. The writer served as a change agent to transform the schools to prepare students to study and work in a technologically rich society.

The writer furnished advice and instructional technology training to the administrators and teachers on an individual and group basis. Additionally, the writer

provided limited retail sales of computers and software to the schools as well as to teachers and parents.

The writer had been contracted by each school in this practicum location to install, set up, and configure a Pentium server that ran Windows NT Server 4.0, a 56K modem, Microsoft Front Page, Web-Whacker, and Microsoft Proxy Server 1.0. That enabled each school to establish a secure Intranet within each building and provide simultaneous multi-user network access to the Internet from any location on the Intranet via a 56K modem and a single dial-in Plain Old Telephone System (POTS) line. The writer was engaged by each school to install, set up, and configure a computer lab in each building to assure each system had Windows 95, Microsoft Works, Logo, Eudora, and Internet Explorer. The writer had successfully worked as a reading specialist and mathematics teacher for students ranging from kindergarten through twelfth grade in the same county as the practicum. The writer had served non-public schools for the past 25 years. The writer had authored and published twelve graduate level technology in-service courses through the State Department of Education that had been offered to area teachers in the county of the practicum. The writer had established a role in the community as a resource in providing a wide range of

instructional services and had gained recognition as a leader in community projects.

Chapter II: Study of the Problem

Problem Statement

While the schools provided their faculty with the appropriate Instructional Technology (IT), as mandated by the central administration, the teachers were not utilizing the resources to provide students with the skills necessary to work and study in a technologically rich society.

Problem Description

Teachers at each school had access to computers connected to the Internet. However, they reported they did not know how to use them to provide instruction to their students. The teachers had been offered and encouraged to attend traditionally delivered training classes after school, on weekends, and during summer vacation. Many did not participate in the programs. Therefore, they did not receive training to use the equipment.

Teachers also had access to application software such as Microsoft Works. Again, they reported that they did not know how to use it. Teachers did not know how to create, edit, save or print word processing documents, spreadsheets or databases to digitally communicate with their learners. Although all teachers had e-mail accounts, many reported

they did not know how to compose, send, or receive messages in order to communicate with colleagues and students.

Teachers were provided software to develop web pages to supplement curricula content; however, principals reported that teachers did not know how to use that software to improve students' performance in the curricula. In addition, teachers had access to the World Wide Web, but did not know how to search for topics using simple search engines to locate supplemental resources for the curricula.

Simultaneous to these conditions, the enrollments of these schools were starting to decline. The decline occurred at a time when other schools in the area were reporting increases in student populations.

Problem Documentation

The writer used a variety of methods to gather information that verified the proposed problem existed. The methods of investigation included, first hand experience, surveys, interviews, and published documents.

Interviews were conducted with each school's principal, the assistant superintendent, and teachers. The interviews were conducted over a period covering September 1996 to March 1998.

In a 1996 interview conducted with a school principal, the writer was informed that the Diocese requested its member schools implement a plan to integrate technology into the school system to improve instruction and reverse declining enrollments. During the meeting the principal requested the writer's assistance to purchase and install computers so their school met the organization's request.

Interviews and discussions were also conducted with the principals of the other schools. They confirmed that the organization had provided it members with funds, resources and guidance to achieve the conditions of the technology mandate. These meetings occurred between the period of September 1996 and July 1997.

Further evidence gathered by the writer that supported the schools were attempting to comply with the mandate was obtained as the result of a consultant / client relationship the writer had with the schools. (That relationship began prior to the preparation to develop this practicum.) The writer had been contacted by each school to recommend, install and configure a computer lab. Each school purchased a computer lab based upon the Windows 95 platform. Each lab had a server equipped with Windows NT and a 56K modem. A proxy server was installed on each server to allow all workstations on the network to share

the Internet resources. The recommendation to use that configuration was based upon the schools limited budgets and their need to provide all teachers with access to resources on the Internet and e-mail. As a result of analyzing the information provided by administrators and first hand experience of the writer, it was determined that the schools had provided resources that were adequate to comply with organization's technology mandate.

Satisfied that the available resources met an acceptable standard, the writer sought to determine whether training was offered to the teachers. Because of the consultant / client relationship that developed as the result of the purchase of the computer labs, the writer was able to verify that each school offered training to the teachers. The schools agreed to provide the training to the teachers after school. Each school provided training after school, on a voluntary basis, to any teacher who was able to attend. Topics offered included an introduction to the Windows 95 graphical user interface (GUI), using the Internet and e-mail. Although the schools provided their own training, teachers were also encouraged to participate in training programs outside of their organizations.

The writer was able to determine that a variety of outside sources offered similar training programs to the

teachers. They, too, were offered during evening hours, weekends, and vacation periods. Likewise, the topics included instruction to send and receive e-mail, use word processing software, use spreadsheet software, use database software and navigate on the Internet. This information was compiled from brochures provided by the local colleges and the regional intermediate unit. It was gathered on an on-going basis since 1996.

More evidence was obtained in 1997 during a Board of Directors meeting held in one of the schools. The Superintendent of Curriculum for the organization announced the school would begin a new heterogeneous, multi-aged class grouping method of instruction. As a result of a decision made by the organization, the school's President of the Board announced the decision to purchase and use a computer lab to support a more flexible multi-level curriculum. The administration recommended that the teachers participate in after school training to get familiarized with the new equipment. The school administrators anticipated the need for assisting the teachers and had arranged for a series of in-service classes to correspond with the installation of the newly purchased computer lab. Teachers attending the board meeting agreed such a transformation would benefit the

students. They requested the administration provide in-service training during regularly scheduled school time. In turn, the administration stated the cost of using substitute teachers and the potential causing disruption of instructional continuity made that scenario unlikely. The training scheduled for after school proceeded as originally planned. This information came from a school administrator, conversations that took place during the board meeting, and follow-up conversations conducted by the writer.

Based on the information collected, the writer was able to determine that technology training was offered by the organization to the teachers. The information also revealed that the teachers had several options to attend training at a variety of times and locations.

Next, the writer attempted to determine if the teachers were making efforts to support the technology mandate. To accomplish that, a survey was distributed to all of the teachers. It was conducted in November of 1997. It was designed to assess teachers' access, use, and interest for using computers (see Appendix A).

The survey asked 50 teachers to reply to 12 questions. The information gathered revealed that 24 teachers had home computers that were capable of accessing the Internet. Twenty-eight teachers reported that they had access to e-

mail, even though all 50 teachers were provided with a free e-mail address and free training through the school. Thirty-five teachers reported that they were not able to search the Internet. When asked if they had access to computers in school, 45 reported access before school, 38 reported access during the school day, and 41 reported access after school. Thirty-nine teachers reported interest in training that was integrated with the curriculum while 24 teachers reported that they would not be interested in participating in training (when it was not paired with curriculum) even if it did not interfere with personal time outside of the regular school day.

The final question asked the replier to indicate if they had participated in technology training by listing the number of credits earned in that area. If a teacher responded none, zero, or left it blank, the writer recorded that that teacher had not taken any technology related classes. If the replier responded with any ordinal number other than zero, the writer recorded that the teacher did attend courses related to technology. Nineteen teachers affirmed participation.

The writer also had an opportunity to discuss teacher motivation for attending training with a group of nine teachers. The writer was asked by the administration to

develop and offer a three-credit graduate level course to train its teachers to use word-processing, spreadsheets, databases and Internet technologies. That request came in March 1996. The training was offered after school at a centrally located computer lab. Arrangements were made to provide each teacher a $150 stipend upon the successful completion of the training. In addition, the cost of the tuition was waived. Although the class was designed to accommodate 25 participants, only nine teachers from a regional population of 300 enrolled. When the writer queried the teachers for their opinion to explain the low interest, the teachers suggested that many colleagues felt they were too old, too scared, or too busy to attend training related to technology. They also stated that teachers were dissatisfied with computer training classes that assigned work that was not directly used in their curriculum.

Another source of information was obtained from a poll conducted in 1996 by one school's principal, prior to the installation of their computer lab. Its purpose was to determine faculty interest toward computer training as a topic for staff development at an in-service meeting. According to that principal, 4 of the 7 teachers in that

school had not enrolled in any courses related to information or instructional technology.

Based on the information gathered from the teachers and the principals, the writer determined that the teachers were not prepared to use the technology resources located at each school. Information collected from the survey and interviews revealed that the majority of teachers had not participated in training that was offered. Therefore, they were unable to use the resources for classroom administration or teaching.

Causative Analysis

After collecting information from the teachers and administrators, the writer began a search to determine the cause or causes for the problem of preparing teachers to use the available technology resources. Four areas were analyzed. They included procedures, people, materials / equipment, and attitudes. Based on the information provided by the teachers, administrators, the writer's experiences and published information, several causes were identified as contributing to the problem.

Information obtained from all of the mentioned sources confirmed that administrators budgeted funds to purchase equipment and provide training for teachers after school,

on weekends, and during summer vacations. No arrangements were made to fulfill requests by the teachers to provide training during a regular school day when the teachers were available. Principals were advised by the organizational leadership to recommend traditional technology in-service training to the faculties through local colleges and the intermediate unit. Those courses were offered after school. Although the administration made significant efforts to provide training, it was offered when teachers were not willing or able to attend. The writer attributed that the procedures administrators followed failed to include provisions to get teacher input. Therefore, it did meet their perceived needs. Without considering teaching input, the procedure did not gain the support of the teachers.

Another contributing factor was that administrators did not provide adequate resource time for teachers to develop curricula-integrated technology projects. Teachers were not motivated to develop technology skills because they were not allotted sufficient time to search for resources that could use technology to supplement content in the curriculum. That condition seemed to arise from two sources. Both the teachers and the administrators contributed. Teacher attitudes were not congruent with the

mission of the organization or the vision of the technology mandate. Simultaneously, administrators attempted to utilize a traditional model for developing procedures for allocating resources and resource time for technology related decisions.

Teachers did not feel the need to learn about computers because it was not stated within their written curriculum. Materials supplied to teacher did not provide resources to integrate the curriculum with technology. Again, the source of the problem was shared between the teachers and the administration. The attitudes of the teachers did not compensate for the lack of materials and resources provided by the administration.

Another cause for the problem was attributed to the quality of training teachers received. Teachers reported that the training that was offered failed to meet their needs. That information was conveyed to organizational administrators, school administrators and in-service providers. There was absence of instructional leadership.

Finally, equipment was purchased without a coordinating plan to provide support staff to maintain it. In an attempt to obtain as much technology as the budget allowed, administrators had not foreseen the need for

specific support that targeted routine classroom operation and simple maintenance.

Relationship of the Problem to the Literature

Several areas were identified as relating to the problem. They were researched using printed and electronically delivered media. The topics searched included faculty training, distance education training, Internet training, e-mail usage, web-based training, online training, technology training, technology infusion, and professional development.

Rice (1995) noted that simply supplying teachers with technology did not translate into the successful integration of technology into the curriculum. Rice reported that instruction was more effective when the teachers had access to a successful model from which to prepare and refer. Inadequate teacher training had a negative impact on the quality of instruction when technology was implemented without faculty training.

According to Novek (1996), teachers' pre-existing perceptions had a negative impact on the success of an instructional program that was attempting to implement technology. Novek revealed that teachers held personal views of skepticism about the value of technology within

the school's work setting. The writer attributed the cause of this to be computers were perceived as threatening.

Albaugh (1997) reported teachers resisted the change technology presented to classroom management and instruction. According to Albaugh, teachers perceived computers as an ineffective tool for teaching. Albaugh concluded that the cause of this perception was that the computer was marketed as a game. If teachers perceived computers as expensive games, they might resist an attempt to integrate the technology into their classroom.

Burmeister (1993) reported faculty used computers proportionally to their availability in the classrooms to perform "routine drill and practice" (p. 22) exercises or simple word processing. Burmeister supported that observation by surveying the technology available and recording what teachers actually utilized. Burmeister's study suggested several contributing factors including costs and a dependency on teachers' experiences.

Black (1991) reported schools had not addressed the basic needs of learners, including students and teachers. Black supported this by reporting results that demonstrated the faculty's reluctance and their district's limited plan. From Black's inquiry, one can conclude that, time and costs were very important factors that affected a faculty's

perception about the value of technology in improving student achievement with instructional technology.

According to Pierpont and Davis(1996), falling enrollment was a strong argument for staff development to upgrade. Pierpont and Davis found that as a result of declining numbers of high school graduates, increased competition from other two-year colleges, and decreased financial aid, studied groups experienced a decrease in enrollment. In an attempt to resolve this, efforts were made to renew their role as leaders in creative teaching methods thereby enhancing the delivery of instruction and services. Those efforts included providing in-service training to faculty and enhancing professional development through offering regular in-service and technical workshops.

Mende (1996) found training to be essential for computer skills and the new social skills associated with computers. Mende reported that instructors who provided the learner with structure and a support system achieved greater success than those programs that did not. Mende concluded that teachers needed to be informed on that they were expected to teach.

Rice (1995) found that there was a need for a shared vision between teachers and other stakeholders in order for

successful technology integration into the community. Rice supported this by demonstrating how various areas contributed to the change process within the school organization. Failing to account for these areas had led to a less effective result. A possible cause for this condition may have been attributed to the lack of planning and coordinating for effective integration of technology into a school on a system level.

Wagner (1993) reported that in order to have a successful training program, a program must include needs assessment, audience examination, instructional design, course selection, reconfiguration, and instructional delivery systems. Wagner surveyed a range of field factors that positively or negatively impacted a program. Wagner concluded that change was more likely to occur when change was expected rather than desired.

Rice (1995) found that teachers were initially enthusiastic about the integration of technology. She noted that some of the problems that existed were teachers feeling isolated from each other as well as feeling distant from the parents and community. Teachers found it difficult to keep current with the rapid changing technology. They were frustrated with school districts that had a shortage of resources with which to support

teachers. They were expected to facilitate diverse learners as well as incorporate innovative assessment techniques. Teachers and administrators felt there was a lack of shared vision of the role of the school in the preparation of students as citizens.

Rice (1995) noted teachers she interviewed felt they would benefit from having increased interaction with their peers in order to share learning ideas along with having mini-service classes to give them a better understanding of the technology. Having someone to assist them in finding interesting applications to incorporate into the curriculum and sharing this advancement of technology with parents and community would be an advantage to teachers. Rice attributed the cause of this to conditions where teachers were frustrated by the lack of sufficient equipment for all students, the lack of peer interaction to share ideas and problems, and the lack of time to be properly trained. In addition, frustrations stemmed from the lack of time needed to research new additions to the curriculum.

According to Adams (1993), some of the most common obstacles for teachers were overcoming the limited knowledge available, attending user training, and finding access to computers. Adams suggested that when conditions were met, an organization could rely on a more positive

outcome when employing technology within the curriculum. A cause for this condition was attributed to a lack of planning. Adams suggested that planning had to meet the needs of the individual learner.

Bennett (1991) reported teachers were motivated to succeed in staff development when the physiological, security, social, and self-esteem levels were satisfied. By reviewing documentation and comparing it to recognized beliefs held by a portion of the learning community, Bennett provided an argument that supported a need for changing initial misconceptions teachers had about engaging in technology-related staff development programs. A cause of this behavior was explained by prioritizing a learner's intrinsic and extrinsic goals.

Brace and Roberts (1996) argued that while some teachers embraced the use of technology in their curriculum, most teachers needed encouragement, time to learn the presented system, accessibility to the equipment, and support before they integrated technology into the classroom. They supported the observation by reporting how access and time improved technology performance. Therefore, simply supplying equipment did not translate into productive use by faculty.

Busher (1994) reported when teachers had a positive attitude about using computers, peer teaching neither helped nor hindered. Busher noted that when two groups of enthusiastic professional teachers were studied, the two groups showed no significant change in their attitudes and beliefs even though the first group was presented with peer coaching while the second was not. According to Busher, the reason was due to the previously established attitudes of the two groups. Busher demonstrated that no single method of instruction was successful in improving performance for any one group of learners.

Rice (1995) noted that teachers did not have the time or motivation to learn new technology unless it was easy and provided a direct benefit for the classroom environment. She noted that the teachers she studied felt the only reason they had time to learn new technology was because it was beneficial to the students. If this were not the case, they would not have time for training. Rice concluded the it was due to several concerns including the lack of time manifesting from the teachers' apprehensions about the unknown, and a frustration from the length of time needed to learn something new. Coupled with these, frustration was also attributed to difficulties in the administrators' lack of understanding that training was

beneficial to the educational process and progress of the education.

Topp (1995) found lunch hour training sessions provided at least a partial solution to the problem of offering adequate training during times when teachers are available. Topp demonstrated teachers responded to innovation when they were adequately motivated. Providing convenient training can motivate and cause a learner to participate in a program that they may otherwise not have attended.

Dale (1992) found that delegating tasks such as posting a duty roster, an advanced scheduling calendar, and daily time sheets aids in volunteer programs. Dale noted that the media specialist observed these training strategies coupled with some personal factors and organizational strategies resulted in widespread effectiveness of the program. A cause for this success for these processes was attributed to the foresight of the administration to adequately prepare a work environment that allowed for time and resource management.

Rice (1995) cautioned that it was important to avoid gender bias when training both teachers and students in the use of technology. Rice found there was a gender bias when teaching math, science, and technology. Teachers focused

more on boys' answers rather than girls'. Teachers called on boys more often and asked boys to solve problems yet solved the problem for girls resulting in girls feeling intimidated by math, science, and technology. Therefore, Rice found although boys and girls were presented with the same opportunities in technology education, girls were not performing to their fullest potential because of the inequity in teaching the genders.

Marcinkiewicz (1996) found that it was easier for teachers to adopt the use of computers if computer integration was expected. Marcinkiewicz's research showed that teachers saw their time as valuable and may not have wanted to experiment with proven and successful practices. The cause for this condition was insufficient planning on the part of administrators to adequately provide awareness for the positive impact of new technologies on instructional outcomes for their faculty.

Oke (1992) noted that by requiring students to complete assignments using technology, tying these assignments to the curriculum, and having teachers model to the students on the appropriate use of technology. It served as a shared learning experience for both teachers and students. Teachers and students reported better results when these factors were present. A cause for this could

have been that teachers did not perceive the use of technology as wasted time when the result was directly tied to the learner's observable output.

According to Papert as cited by Talbot (1995), technology should not be simply learned. The student will not gain as much knowledge as compared to when the student actually used the equipment at hand. Papert would argue collaborative learning breeds change and reform as learning is facilitated more easily when groups of like-minded people are permitted to explore the learning process together. Talbott further stated the immediacy of learning is a cause for teaching of technology, more so than simply using textbooks, chalk, and lectures.

Byron (1995) reported teachers found value in adding technology to the delivery of instruction. She found teachers felt that if time were provided for redesigning courses to include technology and reliable support and the equipment was available, technology would add great value to the educational process. It could be concluded that preparing instructors to overcome issues of readiness could improve a staff development program to increase successful results.

Parker (1996) wrote that teachers were more willing to use technology when support was available, suitable

equipment training was provided, and someone to assist with the equipment was available. Planning for their presence lowered the frustration that the teachers reported when they were asked to change the way they delivered the curriculum.

Yin and Krentz (1995) reported that a person in the form of a transformer, one who worked with the teachers, had helped teachers in the selection of resources. When teachers were provided a method to insure the successful delivery of content with technological resources that may have been unfamiliar to the instructor, the resources enhanced the curriculum rather than distracted it. The cause for this was attributed to a proliferation of inter-dependent technology without an industry standard.

Imel (1996), attributed the success of a distance education program within schools he studied, to the use of networks to deliver instructional materials. He documented changes in education that supported distance learning as a result of networking technologies that provided learners with the accessibility to training. Imel reported that network technology provided a foundation to lay down the building blocks of a new paradigm.

Chapter III: Anticipated Outcomes and Evaluation Instruments

Goals and Expectations

This practicum was designed to train teachers to use a variety of Internet technologies. The training was expected to prepare teachers to develop new ways to use the school's existing technology resources. Teachers were expected to communicate with peers, to collaborate with fellow faculty members, and to use the World Wide Web to locate resources to supplement the curriculum.

Expected Outcomes

A total of 6 outcomes were expected for this practicum.

Outcome 1. Thirty-two of 36 participants will successfully interact with a Windows 95 Interface system to boot the computer to log onto the network. They will then locate, open, and close such resources as Microsoft Works, Microsoft Paint, and Notepad from the Windows 95 desktop.

Outcome 2. Thirty-two of 36 participants will identify and activate the Internet Explorer to access specified web-sites on the Internet or intranet during training. The participants will locate three web-sites on the Internet or intranet during training. The minimum acceptable standard

of performance upon completion of training will be each participant's ability to print 3 web-sites to hand into the instructor.

Outcome 3. Thirty-two of the 36 participants will successfully search and locate information using web browsers such as Yahoo and AltaVista. The participants will select a topic and locate content to report facts in order to support or argue against that particular chosen topic. The minimum acceptable standard will be based upon a survey completed by each participant on his or her chosen topic.

Outcome 4. Thirty of 36 participants will successfully locate and activate the Eudora icon for e-mail. The participants will select the Eudora icon for e-mail and send an e-mail message to the instructor during training. The minimum acceptable standard of performance will be based upon each participant's ability to maintain ongoing correspondence with the instructor for a period of two weeks encompassing five e-mail exchanges of receiving and sending messages.

Outcome 5. Twenty-seven of the 36 participants will create a web page utilizing Microsoft Front Page. The participants will formulate a title, personal information, and incorporate at least three external links. The minimum

acceptable standard of performance for each participant upon completion of training will be to create a web page and submit it for publication on the Internet.

Outcome 6. Thirty-four of 36 participants will create a project utilizing information off the Internet in collaboration with another teacher that provides an assignment whose content will cross at least two curriculum areas. Participants will devise a project utilizing information from the Internet and organize this information into a collaborative project with another teacher. The minimum acceptable standard of performance after training will be each participant's ability to correspond with each other regarding the content of the created project and its utilization within the two areas of curriculum.

Measurement of Outcomes

The measurement of the outcomes encompassed several strategies. Each had its own standard of achievement and was measured by the writer. As each participant achieved the standard to satisfy the criteria of an outcome, the results were recorded on an outcome checklist (see Appendix B). Outcomes were measured as follows:

Outcome 1 was measured using a checklist. Participants were judged successful interaction with Windows 95 to boot

the PC, log onto the network, locate, open, and close resources. The instructor observed each participant to determine if they could demonstrate the skills then record the results using a checklist (see Appendix C). The minimum acceptable standard of performance for each participant was based on the participant's ability to complete these tasks without.

Outcome 2 was measured using a curriculum project data collection form. Participants were asked to identify and to activate the Internet Explorer to access specified web-sites on the Internet or intranet (see Appendix D). The instructor then observed each participant locate three web sites on the Internet and intranet during training. The minimum acceptable standard of performance upon completion of training was each participant's ability to print three web sites to hand into the instructor.

Outcome 3 was measured using a curriculum project data collection form (see Appendix D). Participants were asked to search and to locate information using web browsers Yahoo and AltaVista, the instructor recorded the results of the exercise as the participants selected a topic and located content to report facts in order to support or to argue against that particular topic. The minimum acceptable standard of performance was based upon a

survey completed by each participant on his or her chosen topic.

Outcome 4 was measured using an e-mail checklist (see Appendix E). Participants were asked to locate the Eudora icon for E-mail, to select it, and to send an e-mail message to the instructor during training. The minimum acceptable standard of performance would be based upon each participant's ability to maintain ongoing correspondence with the instructor for a period of two weeks encompassing five e-mail exchanges of receiving and sending messages.

Outcome 5 was measured using an outcome checklist (see Appendix B). Participants were asked to create a web page utilizing Microsoft Front Page to formulate a title, to personal information, and to incorporate at least three external links. The minimum acceptable standard of performance for each participant upon completion of training was to be to create a web page and to submit it for publication on the Internet.

Outcome 6 was measured using a curriculum project data collection sheet (see Appendix D). Participants were asked to create a project utilizing information off the Internet in collaboration with another teacher where the content would integrate at least two curriculum areas. Each teacher was asked to utilize information from the Internet

and to organize the information into a collaborative project with another teacher. The instructor evaluated the project for clarity, organization, and usability with current curriculum resources such as textbooks, workbooks, or other resources that are provided to students.

Chapter IV: Solution Strategy

Discussion and Evaluation of Solutions

While the schools provided their faculties with the appropriate Instructional Technology (IT), the teachers were not utilizing those resources to provide their students with the skills necessary to work and study in a technologically rich society as mandated by the central administration.

During the writer's review of the literature, material was selected from the World Wide Web, professional journals, ERIC, and recently published books. These sources of information provided insight into supportive evidence and causes of problems relating to school reform, the role of technology, faculty training, strategic planning, peer mentoring, technological training assistants, curriculum development, distance education, Internet training, e-mail usage, web-based training, online training, technology infusion, and professional development of faculty.

The writer extracted a wide range of possible solutions from the literature review. The solutions were synthesized into a multi-faceted strategy to help teachers improve instruction.

Albaugh (1997) reported teachers' perceptions can affect the success of a program. An awareness program could provide teachers with the insights necessary to share in a mutually beneficial vision. From the perspective of the practicum, an ongoing awareness program can be implemented to provide teachers with the necessary background experience to "invest in" (p. 12) the school's instructional technology vision. The writer's decision to use this strategy as a solution was hinged upon the notion that as teachers were introduced to personal web pages, publishing about one's self would motivate personal interest.

Communications were improved with electronic mail and a bulletin board helping participants share insights and subject matter as stated by Burmeister (1993). From the perspective of the practicum, this method of communication provided faculties with the capabilities to get assistance in a more timely manner. The writer's choice in using this solution was based on the context of the work environment where teachers were isolated from co-workers and other forms of support.

Adams 1993) and Black (1991) improved teachers' use of technology in the instructional curriculum by demonstrating how learners are negatively impacted by the financial

restraints caused by time and place instruction. Both pointed out that effective planning would provide a financial justification for the acquisition of adequate hardware and software. By making training available on demand, it decreased the time teachers would be asked to participate in staff training on their personal time. The writer selected this solution because of the availability of the intranet infrastructure and the population's willingness to participate in an instructional training program scheduled during the regular workday.

Marcinkiewicz (1996), Byron (1995), and Oke (1992) reported increased use of technology by teachers when activities fit into areas of the curriculum where the teachers felt it met their classrooms' needs. By tying the material of the curriculum into the staff development project, teachers from these schools would maximize the use of their time. The writer selected this solution because the resources were already in place. Also, it provided for a wider distribution of instruction and more economical management of time.

Nissen and Ross (1996) have employed mentors to successfully provide learners with research skills for querying electronic databases to access and to research information. From the perspective of the school, faculty

members would be employing sophisticated use of technology to provide instruction to students with a decreased amount of time necessary to attend training. The writer has selected this solution to maximize the range of experiences teachers encountered every time they had the opportunity to interact with technology. It also provided teachers with a support structure that encouraged the exploration of technology by reducing fears of failure.

Imel (1996) reported improved communications with network communications. From the perspective of the school, the administration had purchased equipment to develop technology vision. Accessing resources would be maximized by Internet access when the staff became effective users of these resources. This solution was selected because of the existing Intranet infrastructure within the schools.

Rice (1995) increased acceptance within her organization by offering stakeholders an opportunity to provide input into the direction of the instruction. The schools within the practicum had a long tradition of meeting the needs of its learners. The writer selected this solution because of the previous support provided by these groups. It also allowed teachers to share in the technology vision.

By providing technical support personnel who reduced the need for advanced technical support, Parker (1996) reduced opposition and rejection of beginning users. From the perspective of these schools, this would allow teachers to focus their attentions on their area of instruction and to reduce the time that would be needed for training to build those technically oriented skills. The writer selected this solution because of the existing infrastructure and the results of a survey that indicated reluctance from teachers to pursue technically oriented instruction.

Dale (1992) reported organizations relied on teamwork. Publishing duties provided team members with necessary structure to manage inter-team relations. From the perspective of this school, teachers, school technologists, and college interns would need to collaborate in order to successfully implement instructional technology projects where task assignments were inter-related throughout each group's responsibilities. This was selected as a solution for this location to strengthen the effectiveness of the team concept.

Description of Selected Solutions

The writer derived an idea from the review of literature that used the characteristics from a variety of sources to build "rungs on a ladder". By raising the standard for teachers to employ the existing technology at the school, the quality of instruction would improve. This project established an awareness program for all essential stakeholder groups to participate and gain a sense of ownership into instructional technology resulting in a bond of cooperation. It elevated the awareness of its members to a level of utilization by employing a multi-faceted assistance program that combined the use of human, EPSS, and written support that was timely and cost effective.

Utilization of the existing digital technologies was increased as the faculty of this practicum location acquired a greater sense of mastery and independence through ongoing hands-on training exercises held during regularly scheduled in-service meetings. At the summit of this practicum project, teachers observed the rewards of their labors as students successfully produced projects that were published publicly on the Internet's World Wide Web.

First, instructional technologists were selected to provide teacher training during regularly scheduled in-

service programs. The solution was justified because teachers had not participated in training programs offered after school.

Second, teachers, students, college interns, and other volunteers were encouraged to assist (mentor) teachers in developing and utilizing instructional technologies during and throughout the school day. This solution was justified because it provided additional support to those teachers who limited their use of the (digital) instructional technologies "IT" to avoid encountering problems with the equipment.

Third, teachers were provided with a computer in their classroom to provide easy access to network resources during the school day. This solution was justified because it provided teachers with "IT" resources without having to leave the classroom.

Finally, computers were provided to teachers to take home over summer vacation with the necessary setup to access the World Wide Web. E-mail was also available so teachers could continue training by communicating with the practicum administrator and school instructional technologists. This solution was justified because it provided teachers with "IT" resources after school while diminishing their travel time.

The writer assumed a leadership role throughout the project. The writer served as a webmaster and administrator of the web pages that distributed instructional content and provided a forum to facilitate communication. The writer served as a training coordinator for the school technologists and college interns. The writer maintained the role of Instructional Technology Consultant to the school principals and administrator.

Report of Action Taken

The practicum was conducted over an eight-month period. It was divided into three phases. Each phase utilized the Internet for different purpose. Initially, the Internet was used to gain the attention of teachers, students and parents. Next, the Internet was used to deliver instruction and assist communication for the staff. Finally the it was used to deliver content to the students. As the practicum moved though each phase, the duties of the writer also changed.

The first phase was developed to provide training to the school technologists and to initiate the faculty's awareness. Immediately upon implementation, a web site and a domain name were established by the writer. During the

first month, the writer visited each school weekly. At the first visit, the writer delivered instructional materials and the technologist was provided training to instruct the faculty to use the Windows 95 graphical user interface. The principal at each school was encouraged to attend the technologist's training.

The first month also provided time for the writer to visit each school to meet with the faculty to stimulate interest and to develop their awareness. The writer explained the purpose of the practicum with the assistance of a Power Point presentation. At each school the program was given the title "Got IT," where "IT" referred to Instructional Technology. That slogan was then promoted to the teachers and students by the administration in the form of posters placed in strategic locations around the schools. Announcements were also broadcast over the public address systems and each school had some form of public relations printed in the local newspapers. At the initial faculty meeting (at each school), teachers were presented with the goals and a general outline of the implementation process by the writer. They were apprised of the multiple opportunities to participate in the training. During subsequent visits later that month, the writer took pictures of each faculty member using a digital camera.

The teachers were informed that pictures were intended for developing personalized faculty web pages.

One event stood out during the first month. The principal at one school successfully planned and implemented an evening parent awareness program that provided training of Internet skills to the visitors. The first class was well represented with 23 attendees. The writer developed a brochure that explained the purpose of the practicum and it was distributed at the event. The brochure also served a dual role of providing instructions for accessing the school's Internet resources. The parent session culminated by showing how to access Internet sites that included the White House, the Smithsonian Museums and the school's home page.

There was one unexpected event that occurred during the first month. The Internet provider accidentally erased all faculty e-mail accounts. It took approximately two weeks for the provider to correct the problem.

The second month began the second phase. The second phase was primarily concerned with providing teachers with training to use the Windows 95 GUI and access the intranet resources, as specified in the outcomes. During the second month, the technologists were directed to initiate training in the school labs. The writer recommended that the

training take place during regular school day, at in-service meetings, or at times that were mutually convenient for the teachers and their technologist. The training was designed to provide the teachers with the skills necessary to interact with the school's intranet resources (see Appendix F). Since the in-service meeting had time constraints, the writer also offered supplemental training after school. Teachers were asked to attend on a voluntary basis. The writer visited each school three times to provide training after school. Each session had a separate topic for discussion. The first visit provided training to log onto the school's intranet and access the Internet. The second visit provided training to access school e-mail accounts to send and receive correspondence. The third visit provided teachers with instruction and the opportunity to use a discussion board to conduct on line discussions and exchange ideas among teachers with similar teaching duties at the other schools.

Other activities occurred during that period. Teachers were asked to select what they wanted added to their personal web pages. The teachers' e-mail addresses were posted on the practicum's web site to stimulate interaction.

School was dismissed for the summer recess during the third month of implementation. During the summer vacation, teachers were offered school equipment to practice their technology skills at home. The writer created a "sign out" form to assist in managing the release and collection of computer for the summer recess (see Appendix G). The writer arranged to have the ISP provide a modem and a free dial up Internet account to any teacher who did not own a computer or did not have an existing Internet account. The writer arranged to assist any teacher that needed help setting up the borrowed equipment at home.

During the third, fourth and fifth months, the writer arranged to provide training during designated dates and times at each school. Teachers were encouraged to use both structured classes and on-line resources to improve their skills for using digital technologies to communicate. As teachers requested assistance with applications such as Microsoft Works, the writer created web sites that provided assistance (see Appendix H). Interns were provided by two local colleges to assist with creating web resources. When necessary, the writer met with teachers to provide individual support. During this period each teacher was required to send the writer a minimum of three e-mail messages and to post or to respond three times on the

discussion board. Teachers were required to return all equipment two weeks before the re-opening of school. It was the writer's responsibility to reconfigure and re-introduce the returned computers to the school's network. The writer also used this time to meet with administrators.

During the summer recess, the writer met with each principal and technologist to develop a local strategy that supported teachers using technology. The writer sought to develop opportunities for teachers to use their newly acquired skills with students. The principals were advised on ways to take active roles and provide technology leadership.

There were three noteworthy events that occurred within this time frame. First, the writer had to travel out of town to attend classes. While there, the writer was able to stay in contact with the teachers, technologist and principals using e-mail and the discussion board.

The second event occurred when three teachers from one school completed a collaborative project and posted it on the Internet. That project consisted of putting the spelling words for grades two, three, and four on the school's web site. It was developed as a resource for parents and students. It provided access to the spelling

words for those who did not have access to their book at home.

The third event occurred when a second school successfully hosted a parents' training class. The writer was assisted in presenting a multimedia presentation using the internet and the school's intranet resources by the school's Principal and technologist. The event was attended by parents and teachers.

Two setbacks occurred during that period. A technologist from one school had accepted position in a different district. Another setback occurred when the high school had decided not to wire the proposed classrooms due to budgetary considerations.

Upon the return to school from the summer recess, the project began the third phase of implementation. That phase was designed to integrate technology into the subject content for all grade levels. The writer had developed a technology and curriculum rubric (see Appendix I).

During the sixth month, the technology rubric was distributed to the teachers over the Internet. The writer also created a brochure for each school. It highlighted the technology resources at each school. A review of the outcome evaluations from the second phase revealed that most of the teachers had successfully met the instructional

outcomes. Teachers who had not met the minimum standards were provided with one-to-one training. That training took place during the teachers' free periods. It was provided by interns.

During the final two months, the writer's role transformed to one that served as an advisor and web resource developer. During the seventh month, teachers were encouraged to present requests for assistance over the discussion board and e-mail. During that period the writer visited each school to meet with teachers, principals and technologists to assist in developing and to evaluate collaborative activities among the teachers.

During the final month of the practicum, the writer concentrated on developing web-based resources. Although the writer continued to visit each school server times each month during the third phase, teachers were using electronic communication more frequently. Much of what was previously discussed in person was now being discussed electronically. Initially, a celebrative event was scheduled to conclude the program. It was decided that the event would be delayed to coincide with the traditional mid-year organizational event. The writer prepared certificates for each teacher. The principals were directed

to present the certificates at a teacher appreciation dinner provided by the school.

Chapter V: Results

Results

This practicum was developed to provide faculty and administrators, in a private school setting, with instruction and training to improve the quality of instruction in their pre-kindergarten to grade twelve environment by integrating appropriate digital technologies. The training utilized traditional (time and place) and distance education methods for delivery. It was designed to achieve six instructional outcomes.

Outcome 1. Thirty-two of 36 participants will successfully interact with a Windows 95 Interface system to boot the computer to log onto the network. They will then locate, open, and close such resources as Microsoft Works, Microsoft Paint, and Notepad from the Windows 95 desktop.

This outcome was met. Thirty-six of the 36 teachers met the minimum standard.

Outcome 2. Thirty-two of 36 participants will identify and activate the Internet Explorer to access specified web-sites on the Internet or intranet during training. The participants will locate three web-sites on the Internet or intranet during training. The minimum acceptable standard of performance upon completion of training will be each

participant's ability to print three web-sites to hand into the instructor.

This outcome was met. Thirty-six of the 36 participants were able to identify and to activate the Internet Explorer icon.

Outcome 3. Thirty-two of the 36 participants will successfully search and locate information using web browsers such as Yahoo and AltaVista. The participants will select a topic and locate content to report facts in order to support or to argue against that particular chosen topic. The minimum acceptable standard will be based upon a survey completed by each participant on his or her chosen topic.

This outcome was met. Thirty-five of the 36 met the standard.

Outcome 4. Thirty of 36 participants will successfully locate and activate the Eudora icon for e-mail. The participants will select the Eudora icon for e-mail and send an e-mail message to the instructor during training. The minimum acceptable standard of performance will be based upon each participant's ability to maintain ongoing correspondence with the instructor for a period of two weeks encompassing five e-mail exchanges of receiving and sending messages.

This outcome was met. Thirty-six of the 36 participants met the standard.

Outcome 5. Twenty-seven of the 36 participants will create a web page utilizing Microsoft Front Page. The participants will formulate a title, personal information, and incorporate at least three external links. The minimum acceptable standard of performance for each participant upon completion of training will be to create a web page and to submit it for publication on the Internet.

This outcome was not met. Six of the 36 met the standard.

Outcome 6. Thirty-four of 36 participants will create a project utilizing information off the Internet in collaboration with another teacher that provides an assignment whose content will integrate at least two curriculum areas. Participants will devise a project utilizing information from the Internet and organize this information into a collaborative project with another teacher. The minimum acceptable standard of performance after training will be each participant's ability to correspond with each other regarding the content of the created project and its utilization within the two areas of curriculum.

This outcome was met. Thirty-six of the 36 met the standard.

Discussion

After careful analysis of the conditions that existed in the schools, the writer found that the source of the problem was attributed to several causes. Those causes were the result of different systems interacting within the organization. Salisbury (1996) described how change within one area of the organization affected other areas. Unless planners anticipated the effects one change had on other areas, they risked making changes that did not meet the intended goals (Salisbury 1996, pp. 46-75).

The schools attempted to make changes without addressing all possible outcomes. They attempted to supply equipment and offer training. They even provided financial incentives to motivate teachers to attend training. However, they did not anticipate that the teachers would not participate in training. Dick and Carey (1996, p.92) recommended that planning for instruction had to take learner's "attitudes" and "delivery" into consideration. By providing training during the regular school day, the writer was able to intersect the resources provided by the organization and the participation of the teachers.

The writer also provided other conditions to the practicum to achieve success. Analysis of "group characteristics" (Dick & Carey 1996, pp. 88-105) revealed that the learners had diverse backgrounds in areas of curriculum expertise and experience using computers. In order to optimize the training teachers received, the writer determined that all learners needed to master a set of common skills associated with operating the Windows 95 graphical user interface. Kommers, Grabinger and Dunlop (1996) referred to that as a "macrolevel of design" (p.150). Further attention was given to the "physical aspects" (Dick & Carey, p. 93) of the work area to insure that learners used equipment that was so similar to the equipment used for training, there was no discernable differences to the learners.

The writer controlled the learning environment at several levels. First, hardware and software was configured uniformly throughout each school. That eliminated problems arising from expectations of failure and technical obstacles as suggested by Adams (1993) and Parker (1996). A common port of entry to network resources was developed around the same skills necessary for word processing and other productivity applications.

The creation of resources to develop the skills necessary to attain the goals utilized design elements suggested by Kommers et al. "Microlevel designs" (Kommers,et al., 1996, p.153) created replicable visual aides that were transported across traditionally printed documents and digitally delivered text. Creating printed instructional resources brought a sense of familiarity to the teachers as discussed by Broad and Newstrom (1993). By viewing the same material on the computer screen as obtained from print, the teachers were able to see how the new medium fit into their existing work environment. Resources used for training were congruent with their existing instructional duties. Therefore, completing training satisfied the teacher's responsibility toward fulfilling the organization's technology mandate and classroom preparation simultaneously.

The actual instruction provided to the teachers was devised to provide the learners with a variety of methods. Teachers received group instruction, individualized tutoring and self paced on-line discovery. By employing periodic formative evaluations, the writer was able to direct the learning toward a learning/teaching method that met his/her needs.

Group instruction was conducted at four different locations. Each location had its own instructor. Each instructor was selected by the school's principal and identified as the school's technologist. Each technologist was trained by the writer. The writer also created and provided the training resources to the schools. The dates and times of training were coordinated by the schools' principals and technologists. The technologists were supplied with evaluation checklists to record their observations. Upon the completion of training, each technologist returned an outcome checklist to the writer. The writer used it along with first hand observations to determine if any teacher required additional training. First hand observations were obtained from the practicum's Internet discussion board, e-mail correspondence with individuals, and projects published on the school's web site.

The first outcome, where participants were introduced to the Windows 95 Interface to boot the computer and log onto the network, had thirty-six of the 36 participants reported as successfully demonstrating the skill. During the training session, the technologists were directed to observe the participants locate, open, and close

applications. The technologists then recorded their observations on an Outcome Checklist.

The writer placed the highest priority on that outcome's skill set. Since all other technology skills in the practicum hinged upon them, every learner was monitored by the writer throughout the duration of the practicum. Evaluation was accomplished by observing the output of outcomes 2 and 3 and was consistent with conditions suggested by Gall, Borg and Gall (1996, pp. 373-405). To insure that each participant was able to perform the skills independently, the writer arranged for an intern to verify that each participant was able to perform the skills without any assistance.

Visitations were arranged by the writer with the cooperation of the school principal and technologist. Teachers were alerted to the visitation through a variety of communication tools. Personal contact was made by the administration. The writer contacted the teachers by e-mail. Then the intern confirmed the appointment with the teacher by e-mail. Results of the visitation were then posted on the discussion board.

Outcome 2 was another pivotal priority. It served two significant purposes for each participant. First, it brought enrichment resources to teachers that might be

otherwise unobtainable. Second, it opened the Internet as a source of distance education resources and tools as described by Kearsley and Moore (1996, pp. 157-163). The acquisition of the skills for Outcome 2 provided the learner with access, control, and a medium for collaboration. On the organizational level, teachers who met this outcome were prepared to offer leadership and mentoring to teachers inside their school, to other schools and throughout the community.

The evaluation of Outcome 3, where thirty-five of the 36 participants successfully searched and located information using web browsers was also verified by an intern. There was one participant that did not meet the standard for using a search engine. After analyzing the situation, the writer determined that that individual was located in the school that made implementation changes due to budgetary considerations. The writer concluded that the teacher did not have easy access to the computer lab. It was on another floor. Nor did that individual have access to a computer in his/her classroom. While other teachers in that school were also faced with the same conditions, that teacher did not own a computer. That conclusion was consistent with results reported by Adams (1993).

A l 36 participants were verified by the technologists, interns and the writer to successfully locate and activate Eudora to send and receive e-mail. Although e-mail was the primary source of asynchronous communication, the use of the web based discussion board also provided teachers with a way to collaborate, request, and receive assistance.

Outcome 5 failed to reach its target. Although only six met the original standard for Outcome 5, a more accurate assessment for creating a web page would be that 35 of 36 were able to meet the standard. The reason for this discrepancy was that not all teachers had classroom or lab access to Microsoft Front Page Web Editor as planned. This resource was to have been supplied by a grant from outside the practicum. The obligation was not upheld so the writer solved this conflict by substituting alternate software. Because all teachers had access to other products such as word processors with built in HTML editors, and thirty-five of the 36 were able to create a simple web page using the alternate resource, it is reasonable to infer that this outcome was met. While every teacher contributed to the design and content of their web page, the technologist created and published the final product.

The writer had to observe a wider range of responses to evaluate the results for Outcome 6. Although each teacher had the same guidelines to participate in a collaborative activity, their responsibilities for instruction varied from building to building.

In the first school, each teacher was responsible for taking his/her class to the computer lab for one period each week. In the other two elementary schools, there was one teacher assigned to teach in the computer lab. In the high school, there were three teachers assigned to teach in the computer lab.

At the first school, where each teacher brought their homeroom class to the lab, it was decided that the teacher would select an area where they felt most comfortable teaching. Their choices included word processing, spreadsheets, or databases. The teachers started collaborating by accepting and instituting a developmental skills rubric for word processing. That also led to each teacher integrating two areas of curriculum. Teachers took students into the lab to take spelling quizzes, to write reports for English, science, social studies, or to create graphs with the spreadsheet tool.

In the other two elementary schools, which had designated lab instructors, teachers assigned work to

children that was completed during the computer lab period. The lab teacher was responsible for teaching and evaluating the computer skills such as typing, formatting papers and presentation design. The content area teacher was responsible for evaluating the content of the reports. Since the technologists were the computer lab teachers, that scenario provided the maximum teacher / technologist contact.

In the high school, where there were three teachers who taught specific classes such as desktop publishing, graphic arts, and accounting, there was very little cooperation or collaboration in actual teaching. While the teachers in the high school were observed to meet the standards necessary to achieve the outcome, the writer was unable to find any actual inter-curricular cooperation up to the conclusion of the practicum. While the teachers acquired and demonstrated the skills, they did not deploy them within the curriculum.

The writer determined that conditions were different at the high school level. Those conditions were due in part to the autonomous nature of the faculty culture within the school.

Throughout the implementation process, the writer attempted to provide leadership. The writer's leadership

crossed administrative, instructional, and technology boundaries. According to Bennis and Nanus (1985):

> The leader may generate new views of the future and be a genius at synthesizing and articulating them, this makes a difference only when the vision has been successfully communicated throughout the organization and effectively institutionalized as a guiding principal (pp. 106-107).

To go beyond training and make changes occur, the writer attempted to nurture leadership from within the organization, within each school, and when appropriate on the individual levels.

The purpose of selecting a technologist was to provide a local technology leader at each building as suggested by Yin and Krentz (1995). While the writer provided a recognized leadership in technology, the teachers needed to feel that support would be provided after the practicum if their efforts were going to continue beyond its conclusion.

As individual teachers began to assert their efforts, the writer created opportunities to recognize them. Postings on the discussion board and e-mail announcements were distributed to all of the participants. The writer also met with the principals to commend individual efforts.

To assist principals, the writer provided them opportunities to receive personal individualized training.

The writer attempted to provide each principal with opportunities to demonstrate their technology awareness, by using it for administration. By demonstrating their skills to the teachers, the principals were able to lead by example.

In conclusion, the writer developed the outcomes for this practicum to satisfy multiple systems within and surrounding the organization. Kaufman, Herman and Watters (1996) suggested planning coincide on three levels. They identified organizational, individual, and societal considerations as factors to be planned.

The outcomes met organizational or "strategic" (Kaufman, et al. 1996, p. 22) goals and were developed to encourage replication. That allowed the school in the practicum to serve as role models and offer guidance to their fellow members.

The teachers were encouraged to adapt the multi method approach when working with students. The goals were designed to allow teachers to develop individual teaching strategies.

The planning then attempted to make changes on "mega" level (Kaufman, et al. 1996, p. 23). As teachers became more familiar with the technology, they began to develop

resources they were added to the wealth of information delivered by the Internet.

Through the experience gained from administering this practicum, the writer drew several conclusions:

1. Purchasing computer hardware and software must be coupled with a plan to provide appropriate training that meets the needs of the staff.
2. Digital technologies and distance education techniques are effective in supporting staff development at the local level.
3. Leadership is a key factor for success if a desired change is to occur.
4. Administrators need to budget resource time in addition to hardware and software purchases when developing technology plan.

Recommendations

The writer recommends that the organizational administration take a close look at the results of the efforts of the four schools within this practicum. These schools can act as role models and even assist the rest of the schools in implementing similar programs.

Another recommendation is that the schools budget for the web serving software for each of the networked

classroom and administrative computers. This would allow teachers to create local web sites that would be curriculum oriented and become resources that could be shared with the students when they visited the computer lab.

The writer also recommends that each school recognize that the performance of any computer is limited by the skills of the user. Therefore, teacher skills (or lack of skills) will directly influence the technology's ability to affect the curriculum to support the students and their learning needs regardless of the computer's processing power.

Finally, the writer suggests that schools employ a systems approach to implementing a staff development program. They should see that each teacher has some sense of ownership vested in the change to occur. Every teacher must have easy access to the hardware and software needed to perform the outcomes of the training. Then, times must be arranged to allow the learner to proceed toward the organization's goals. The teachers who had computers at home and in their classrooms attained the highest levels of participation and success.

Dissemination

The dissemination of these results will be as follows. The writer will submit this report to library at Nova Southeastern University to be copied to microfiche for distribution through their normal channels of resource sharing. In addition, this document will be posted on the Internet at the writer's commercial web site. A copy will also be submitted to ERIC. Finally, the writer will be available to present these findings at local, regional and state conferences. The writer is also available for videoconferences via the Internet.

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Appendix A

Faculty Survey

Faculty Survey

I am a doctoral student. I am studying Instructional Technology and Distance Education. As part of my program of study, I am encouraged to complete a practicum project that benefits the community where I work by providing better service using technology. Your school has agreed to participate in my project. The instructional faculty of this school will be involved in this study and will receive valuable instruction, which will include basic microcomputer skills, Internet and E-mail. Please answer the following questions and return this form as ***soon as possible*** to the administrative office. Your help is truly appreciated. Thank you for your timely cooperation.
Salvatore P. Ferraro

1. Do you have a computer at home that ***can*** accommodate an Internet connection ***if*** connected by a modem. (This would include a Mac, Windows or Windows 95 PC?) YES NO

2. Do you currently have an e-mail account at work, school, or at home? YES NO

3. Do you have access to a computer at work before your teaching day starts? YES NO

4. Do you have access to a PC connected to the Internet during the regular school day? YES NO

5 Do you have access to a computer connected to the Internet after school? YES NO

6. Do you know how to use a search engine on the WWW? YES NO

7. Have you ever had training to assess authentic learning projects? YES NO

8. Would you be interested in participating in a Electronic Performance Support System (EPSS) course for Instructional faculty on Internet skills, E-mail skills, and incorporation of technology into the curriculum you teach? YES NO

9. Would you be interested in taking this technology course without tying up your evenings, weekends and summers? YES NO

10. Would you be willing to acquire computer equipment for your home use if incentives were provided to offset your expenses? YES NO

11. How many years have you been teaching? ___ _____

12. How many technology-related college, graduate or in-service for credit courses have you taken in the last 3 years? _____

PLEASE PRINT:
Name_____ Teaching
Area_____
School Location_____ Telephone
Number_____
What is your level of expertise for using a computer?
Circle one.
Beginner Intermediate Advanced Expert

Appendix B

Outcome Checklist

Outcome Checklist

Name	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6
Student 1						
Student 2						
Student 3						
Student 4						
Student 5						
Student 6						
Student 7						
Student 8						
Student 9						
Student 10						
Student 11						
Student 12						
Student 13						
Student 14						
Student 15						
Student 16						
Student 17						
Student 18						
Student 19						
Student 20						
Student 21						
Student 22						
Student 23						
Student 24						
Student 25						
Student 26						
Student 27						
Student 28						
Student 29						
Student 30						
Student 31						
Student 32						
Student 33						
Student 34						
Student 35						
Student 36						
Total						

Appendix C

Skill Checklist

Name:_____Date of Training_____

Instructor's Name _____

Location of Training_____

1. Participant successfully booted computer and logged onto Windows NT network without any outside assistance. YES NO

2. Participant successfully navigated to Paint, opened the application, maximized, minimized and restored the application without any assistance. YES NO

3. Participant successfully located, opened and closed Microsoft Works. YES NO

4. Participant successfully located the Internet Explorer icon and opened it to the intranet home page. YES NO

5. Participant successfully located the favorite button and located the school's home page on the world wide web. YES NO

6. Participant successfully type a URL in the address box to located a non book-marked location. YES NO

I certify that I have observed the individual listed above complete each task as indicated on this check list.

_____ Date _____
Signature of Instructor

Appendix D

Curriculum Project

Select a Topic

1. What is the topic your team has selected to present to the class?

_____

2. What is your team's stance on this topic?

_____

3. What key words did you search for?

_____

4. What sites did you select from Yahoo?

_____
_____
_____
_____

5. What sites did you select from AltaVista?

_____
_____
_____
_____

6. From what site did you find the most available data?

_____

1. From what site did you find the best data?

_____

2. Overall, how did you rate Yahoo? Favorable - Unfavorable

9. Overall, how did your group rate AltaVista?
Favorable - Unfavorable

10. Overall, how did your group rate searching the web as a useful that you or your students would benefit using?
Favorable - Unfavorable

Appendix E

E-mail Checklist

E-mail Checklist

Name	Mail 1	Mail 2	Mail 3	Mail 4	Mail 5	Attach
Student 1						
Student 2						
Student 3						
Student 4						
Student 5						
Student 6						
Student 7						
Student 8						
Student 9						
Student 10						
Student 11						
Student 12						
Student 13						
Student 14						
Student 15						
Student 16						
Student 17						
Student 18						
Student 19						
Student 20						
Student 21						
Student 22						
Student 23						
Student 24						
Student 25						
Student 26						
Student 27						
Student 28						
Student 29						
Student 30						
Student 31						
Student 32						
Student 33						
Student 34						
Student 35						
Student 36						
Total						

APPENDIX F

Skill Analysis for Launching Internet Explorer

1. Launch Internet Explorer
   1.1Power on computer
   1.2 Log on to network
   1.2.1 Type in user name and password
   1.3 Double click on Internet Explorer icon
2. Search and bookmark URLs for Yahoo, Metacrawler, and Infoseek
   2.1.1 Highlight current URL address in Location Bar
   2.1.2 Type in Yahoo URL (www.yahoo.com)
   2.1.3 Press "enter" key
   2.1.4 Click on Bookmarks box in Menu Bar
   2.1.5 Click and drag mouse to "Add Bookmarks"
   2.2.1 Highlight current URL address in Location Bar
   2.2.2 Type in Yahoo URL (www.yahoo.com)
   2.2.3 Press "enter" key
   2.2.4 Click on Bookmarks box in Menu Bar
   2.2.5 Click and drag mouse to "Add Bookmarks"
   2.3.1 Highlight current URL address in Location Bar
   2.3.2 Type in Yahoo URL (www.yahoo.com)
   2.3.3 Press "enter" key
   2.3.4 Click on Bookmarks box in Menu Bar
   2.3.5 Click and drag mouse to "Add Bookmarks"
3. Conduct meaningful searches for curricular and classroom information.
   3.1 Click and drag Bookmark Box on Menu Bar
   3.2 Select a search engine with the Mouse
   3.3 When search dialog box appears, using the Internet Search Tip Sheet Handout, type in words or phrases desiring to search
   3.4 Scroll through the information collected by the search engine
   3.5 Click on desired URL
   3.6 Click on hot spots on pages as needed to conduct a meaningful search
   3.7 Bookmark, if necessary
   3.7.1 Hit "Back" browser box on Menu Bar
   3.7.1.2 Repeat as necessary
   3.7.2.1 Press "back" box"
   3.7.2.2 Repeat process above as many times as needed
4. Print the information from the Internet site
   4.1 Turn on power to the printer
   4.2 Place paper in the printer
   4.3 Click the "Print" box on the Menu Bar
   4.4 Click "OK" on print dialog dox
5. Save information copied and pasted from the Internet to disk
   5.1 Highlight information to be copied
   5.2 Click "Edit" and drag mouse to "Copy"
   5.3 Minimize Internet Explorer
   5.4 Locate and click on word processor con
   5.5 Click "Edit" and drag mouse to "Paste"
   5.6 Place a formatted floppy disk in the A Drive on the computer
   5.7 Click on "save" box on menu bar
   5.8 Click and drag arrow down on drive list box
   5.9 hange drive to A
   5.10 Click "save".

APPENDIX G

Equipment Sign Out Letter and Form

Salvatore P. Ferraro
Cathed Administrator
http://www.cathed.org

Dear Administrators,

We need to follow-up on the "summer equipment for training" component of the Cathed Project. Attached is a sign out sheet that can be copied and distributed to each faculty member who wants to request a computer. It is recommended that you follow the following guidelines.

1. Any teacher who has been designated as a participant should be given first preference. This would include all teachers at School 1, School 2, School 3 . School 4 has a larger teacher population and the number of participants was projected at 10.

2. In order to qualify for the use of a computer for the summer, the prospective teacher should NOT have a computer with an Internet connection at home. If someone has a computer, they should use their own equipment. If they have a computer but they do not have Internet access, we can provide the modem and Internet access for the summer at no cost to the school or teacher.

3. Any teacher taking equipment for the summer should agree to maintain e-mail correspondence and participate in web based discussions. Failure to do so will result in the equipment being recalled.

4. All teachers who "borrow" equipment must agree to take care to keep the equipment in a safe and suitable environment. No teacher will be held responsible for any equipment failures due to normal wear and tear.

5. There is NO COST to the school or teachers for Internet access for the summer project. There is no cost for e-mail. There is no cost for the training. There are no long distance phone calls required. There are no "additional" phone costs to the participants beyond one's existing phone bill.

6. Every teacher who participates in the summer program must agree to abide by the same standards of professionalism on line, as required during school.

If you have any questions, please do not hesitate to contact this office at 675-7205 or e-mail me at bferraro@cathed.org. Please pass this around to your faculty so they can sign up.

Thank you. Salvatore P. Ferraro

1.	2.	3.
4.	5.	6.
7.	8.	9.
10.		

cc: Dr. Marsha Burmeister, NSU
Mr. XXXXXXXX Schools Office

Equipment Sign Out Form

Name:

Home Phone:

Nearest Relative Phone:

Description of Equipment:

Item	Serial Number	Condition

Signature:

Date:

APPENDIX H

Student Skills Chart

CATHED Computer Skills Rubric

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8-12
Keyboard	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard
Mouse	Mouse	Mouse	Mouse	Mouse	Mouse	Mouse	Mouse
Intranet	Intranet	Intranet	Intranet	Intranet	Intranet	Intranet	Intranet
Printer	Printer	Printer	Printer	Printer	Printer	Printer	Printer
Logo	Logo	Logo	Logo	Geometry	Geometry	Geometry	Geometry
WP Level 1	WP Level 2	WP Level 3	WP Level 4	WP Level 4	WP Level 4	WP Level 4	WP Level 4
		SS Level 1	SS Level 2	SS Level 3	SS Level 3	SS Level 4	SS Level4
			DB Level 1	DB Level 2	DB Level 3	DB Level 4	DB Level 4

Skill / Task Associations		Curriculum Integration
WP Level 1	Type a sentence	Spelling / Religion / Reading
WP Level 2	Type a word list. Use Words in sentences.	Spelling / Science / Language
WP Level 3	Compose a paragraph. Add a graphic.	Social Studies / Literature /
WP Level 4	Formats a paragraph for tabs, indents and spacing.	Writing Style
SS Level 1	Enters Rows and Columns. Enters formulas	Math
SS Level 2	Builds formulas for all 4 operations.	Math / Sciences
SS Level 3	Builds computing system	Math / Sciences
SS Level 4	Pre algebra	Math
DB 1	Uses a database to locate	Social Studies/ Language Arts /Science
DB 2	Adds data to existing DB. Analyze output.	Social Studies/ Language Arts /Science
DB 3	Create a DB	Social Studies/ Language Arts /Science
DB 4	Generate Statistical Summary	Social Studies/ Language Arts /Science

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